The spatial dynamics of race in the transition to university: diverse cities and white campuses in UK higher education

Dr Sol Gamsu[1*], Dr Michael Donnelly[1], Prof. Richard Harris[2.]

[1]University of Bath. [2]University of Bristol.

* Corresponding Author.

s.gamsu@bath.ac.uk, m.p.donnelly@bath.ac.uk, rich.harris@bristol.ac.uk

Abstract

Using exceptionally detailed administrative data on all 412,000 students attending university in the UK in 2014-15 combined with spatial census data from 2011 we explore for the first time how the ethnic composition of where students grow up is linked to where they attend university. We calculate a 'diversity score' for every UK university which is then compared to the ethnic diversity of the surrounding area, allowing us to explore the institutional geography of ethnicity in UK universities. These scores provide the basis for a multi-level analysis of factors influencing whether students move towards more or less ethnically diverse universities than where they have grown up. White students are more likely than their ethnic-minority peers to move towards a university that is more diverse than their home neighbourhood. We thus explore how students' mobility decisions for university are influenced by the uneven geography of race in UK cities and universities.

Keywords: race, higher education, university, segregation, student mobilities.

Introduction

Making the transition to higher education has rarely been examined in the context of the uneven geography of racial and ethnic diversity across the UK. Whilst the links between school choice and local neighbourhood and district segregation have been the subject of extensive analysis in the UK and elsewhere (Burgess, Wilson, & Lupton, 2005; Johnston, Burgess, Wilson, & Harris, 2006; Rangvid, 2007), university choice has not been linked to the ethnic segregation of where, geographically speaking, students come from and the institutions they attend. In this paper we seek to approach quantitative analyses of education, ethnic segregation and internal migration from a new perspective. We extend the scope and focus of existing research on internal migration of students by focussing on the more granular scale of student migration for higher education, namely the neighbourhoods they reside in prior to study and the universities they attend. For the first time, we explore how students' spatialised trajectories on entry to university are embedded within the local and institutional geography of race in the UK. We do this by using the qualitative literature around race and higher education choice to suggest an innovative approach to modelling the spatial transition to university.

Until now, the qualitative research on how race affects students' decisions about where to study has not been explored quantitatively within the literature on student migration. Qualitative research has highlighted how students from ethnic-minority backgrounds (Ball, Reay, & David, 2002; Clayton, Crozier, & Reay, 2009; Connor, Tyers, Modood, & Hillage, 2004)[1] choose universities in part in relation to their perceptions of the ethnic composition of universities. Literature exploring internal migration has suggested that the fact that ethnic-minority students tend to live in the large cities will affect whether or not they move out and away to study for university (Finney & Simpson, 2008, p. 68). Simpson and Finney (2009) have also explored the residential movement of different ethnic minorities from and to areas which are more or less ethnically diverse. The literature examining internal migration within the UK has also examined the migration patterns of students (Duke-Williams, 2009; Finney, 2011, pp. 464-465) and has noted the potential for the use of administrative educational data to explore these dynamics in greater depth (Sage, Evandrou, & Falkingham, 2013; Simpson & Finney, 2009, p. 54). For the first time, we combine these literatures to explore how ethnic segregation of young people's home neighbourhoods and universities influences where they move to study. Our methodological approach here involves an innovative combination detailed administrative educational data on a full cohort of UK students going to university with 2011 census data. We thus seek to explore quantitatively what has been suggested by qualitative research around higher education choice, whilst also looking at how ethnic segregation and diversity are important in influencing young people's decisions at a key socio-spatial transition into adult life.

This is also a major contribution to the international literature exploring student migrations. Previous work examining spatial patterns of migration for and after university study in the USA, Italy and China have tended to concentrate on socio-economic family background (Mulder & Clark, 2002), employment prospects (Dotti, Fratesi, Lenzi, & Percoco, 2013) and the availability and provision of higher education alongside graduate employment prospects (Liu & Xu, 2017). Whilst qualitative work in the US has provided an extensive analysis of the role of race in campus life (Bonilla-Silva & Forman, 2000; Warikoo & de Novais, 2015; Warikoo & Deckman, 2014), students perceptions of race and the racial composition of universities they may attend has not been explored quantitatively in the literature examining the spatial transition for higher education. We thus offer a highly original analysis of student mobility patterns interpreted through the lens of the geography of ethnicity and race in UK neighbourhoods and universities. The student migration literature has previously treated

[1] In line with contemporary usage in UK politics and culture, the term 'students of colour' will be used more frequently here to indicate students from a range of different cultural backgrounds with roots in the Global South.

ethnicity as a variable which may affect students' mobility decisions, but it has not explored how the actual geography of race and ethnic composition of where students live and the institutional geography of race across different universities affects student transitions. This paper seeks to quantify the racialized nature of the student decisions about *where* to study; it thus explores how the geography of race across different neighbourhoods and in different universities combines to influence students' decision-making. In our conclusion we reflect on how patterns of student migration are embedded within a racialized spatial politics of higher education and argue for the need for research to respond to the political demands of students of colour.

We first outline our theoretical framework before providing a descriptive statistical analysis of the diversity of universities in the UK compared to their immediate locality, students' ethnicity and the diversity of students' home neighbourhoods. This provides the basis for some exploratory multi-level modelling where we examine what determines whether students move towards more or less ethnically diverse universities than where they have grown up. We conclude by examining the implications of our findings for future research, exploring in particular how research on the socio-spatial trajectories of students in attending university can be situated within the spatial politics of race in contemporary higher education in the UK.

Theorising the racialised geographies of entry to higher education: a critical approach to spatial trajectories of students of colour

Existing quantitative research on migrations to and from university has tended to frame movements of young people within an understanding of regional economic benefits (Hoare & Corver, 2010), gendered patterns of migration (Faggian, McCann, & Sheppard, 2007) and human capital and ethnicity (Faggian, McCann, & Sheppard, 2006; Finney, 2011). Of these papers only the latter attempt to incorporate ethnicity into understanding how students patterns of movement (or non-movement) to and after university vary. The role of the ethnic composition of school, university or neighbourhood of origin or destination are not incorporated in the analyses. Where the literature on internal migration has sought to examine how ethnicity affects student mobility for university (Finney, 2011; Finney & Simpson, 2008; Simpson & Finney, 2009), the role of higher education has not necessarily been central. Rather, the existing literature analysed the role of higher education as one factor in early decisions about spatial mobility in early adulthood. Furthermore, this work has not explored how decisions about moving for university are influenced by the ethnic-composition of where students grow up as well as perceptions about the ethnic-mix of particular universities.

This paper thus seeks to integrate two previously separate sub-fields of research, taking cues for its framing from the qualitative literature which suggests that ethnic composition of places and institutions may be an important mediating factor in affecting the spatial trajectories of students on entry to university. It also contributes to our understanding of how young people make decisions about spatial mobility on entry to university. Our research seeks to embed research on students' socio-spatial trajectories within the contemporary geography of race and ethnicity in the UK. Staying at home for university is a strategy adopted by several of the ethnic-minority students mentioned in the studies explored below. This allows students to avoid potential discomfort, isolation or racism in a university in a more peripheral region away from large urban centres where students of colour are more likely to be in a minority. Whilst the decision over whether or not to stay at home for university has been the subject of substantial research (Christie, 2007; Finn, 2017; Holdsworth, 2009; Holton & Finn, 2017), the role of ethnicity as a factor in student mobility decisions has received less focussed attention. A notable exception to this is Khamabita and Bhopal (2015) who showed how female students from Indian, Pakistani and Bangladeshi students are all much more likely to stay at home to study than their white peers. In this paper we seek to shed light on the scale of student decision-making in relation to the ethnic mix found on different campuses and how this varies for students growing up in neighbourhoods with different degrees of diversity.

Educational research has shown how a consideration of the ethnic composition of both the university and the place in which they will be studying is central to decisions about where to study for students from ethnic-minority backgrounds (Ball et al., 2002, pp. 337-341; Clayton et al., 2009, pp. 163-164; Connor et al., 2004, pp. 52-53). The analysis of Ball *et al.* (2002) is particularly important here as they indicate how perceptions of ethnic mix at particular universities are highly influential in shaping the choices of working-class ethnic-minority students. For the students in their study of higher education choice in London, attending a university which was perceived to be ethnically mixed would 'background' their own personal ethnicity, making them stand out less than it would in a 'whiter' university in the 'white highlands' of provincial England. As Ball *et al.* (2002: 336) note, the London-setting for their research, underlines the importance of the specific geography of ethnicity students become accustomed to as they grow up. Using this as the basis for the analysis of large-scale quantitative datasets allows us to explore their findings empirically, as well as re-framing the analysis of home to university migrations to make them more sensitive to how broader issues of race and ethnicity are tied to particular geographies and institutions.

The cities in which students grow up are central to how students interpret the 'ethnic mix' of the universities they wish to attend. Ball *et al.* (2002: 336-340) highlight how leaving London is harder, if not impossible for working-class, 'contingent choosers' from ethnic-minority families. For some of these students with more restricted choices, ethnic mix and perceptions of what university life would be like in a less diverse town or region was an important factor in their decisions. In particular, students felt they would or could be more at risk of experiencing racism in such locations. For some students in their study, this was true even for universities like the University of Bedfordshire in Luton, a relatively ethnically mixed and predominantly working-class institution and an ethnically diverse, working-class city close to London. For the student in question, Luton was still not a preferable location to study, with personal knowledge and perceptions of the city as somewhere friends had experienced racism (Ball *et al.* 2002: 339). The city's reputation for being the site of far right nationalist politics has continued in recent years (ITV, 2014). Ball *et al.* (2002: 340) also found that for Cassie, a student of mixed heritage, her parents felt that she 'should go to an area that is like mixed […] if you're mixed race that's the best thing to do.' Unlike her friend Carrie, universities in Wales were out of the question, as there are 'mainly white people there, so I thought it would be quite boring' (Ball *et al.* 2002: 340). Similar experiences and preferences were also reported in Clayton *et al.'s* (2009: 164-165) study, with ethnic-minority students from large cities in the English regions of the North-West and the Midlands having negative experiences on less diverse campuses and expressed a desire to stay in their home city to avoid feeling isolated as 'the odd one out' in whiter universities. For some ethnic-minority students who grow up in ethnically diverse cities, studying in a white-dominated university in a less ethnically mixed part of the country is an undesirable prospect and one which they feel would come at significant personal cost. In the analysis that follows, we also contrast universities' ethnic composition with their surrounding local authority area, providing an institutional survey of the geography of race in contemporary UK higher education.

These issues of the diversity of where students grow up have particular effects on the experiences of students in more elite universities which are often less ethnically mixed than less prestigious universities with larger numbers of working-class students of colour. Work by Warikoo (Warikoo & de Novais, 2015; Warikoo & Deckman, 2014) has highlighted how race and diversity are experienced and approached differently at different elite universities in the US. Notably, she found that white students at elite universities from more segregated white neighbourhoods were likely to be influenced by the 'colour-blind frame' of their lives before college with little awareness of how white students dominate campus life (Warikoo & de Novais, 2015, pp. 870-871). In a UK context, these issues have

been explored by Dumangane (2016) who examined how racism affected the experiences of young black men in elite British universities. Strikingly, a thread running through the experiences of several of his respondents is how experiences of racist stereotypes and feelings of acceptance were associated with particular geographies of university campuses and their cities. One student, 'Bob', highlighted how he felt his experience of being othered by white students was more extreme in the elite, white-dominated spaces of an Oxbridge university town. This exclusive educational setting was perceived as less tolerant than university life in a city like London or Manchester where students were likely to be more accustomed to seeing people of colour (Dumangane, 2016, pp. 166-168). Bob's ambition to work in London was in part influenced by his desire to feel at ease within these more convivial less overtly white-dominated cities. The overlap between university experience for ethnic-minority students in more or less ethnically mixed institutions and the geography of ethnic mix of different towns and cities is clearly closely related and worthy of further exploration. In this paper we seek to try and quantify the scale of student movements between ethnically diverse neighbourhoods where students grow up and universities with different degrees of ethnic mix. We also explore differences between different ethnic-minority groups and how they navigate these socio-spatial trajectories between home and university which are embedded in institutional and neighbourhood geographies of race and ethnicity.

Data and methods

Our information on students comes from the Higher Education Statistics Agency (HESA), and we use a specially requested data-set that provides a level of exceptional detail on individual students in higher education. HESA is the organisation responsible for collecting data from all higher education institutions (HEIs) in all four UK countries, providing comprehensive coverage and a granular level of detail on students. Our data-set includes information on 412,740 UK domiciled students who enrolled in their first full time undergraduate degree course in 2014 at a UK HEI. It contains a rich level of detail including student social and demographic information (gender, age, ethnicity, socio-economic classification (using the National Statistics Socio-economic Classification (NS-SEC), parental education, home postcode, name of previous school attended (and whether this was private/state) and prior attainment as well as HE destinations data (institution attended, course of study, type of term-time accommodation). These data provide the basis of our analysis of how students' spatial trajectories to higher education are affected by the ethnic composition of the schools, neighbourhoods and cities they grow up in and the universities they attend. In terms of controlling for social background, a range of variables are used in our analyses to account for limitations of any single measure. In terms of the socio-economic classification variable, this uses the NS-SEC (Rose, Pevalin,

& O'Reilly, 2005) which categorises students on an 8-point scale according to their self-reported parents' occupation. Whilst this classificatory measure of social class has been criticised on account of missing data as well as broader theoretical debates around the theoretical understanding of class underpinning the NS-SEC (Savage, 2000), it avoids some of the shortcomings of purely economic measures (such as free school meals) and gives a more nuanced account of the positioning of social groups by occupation. To try to address some of the shortcomings in NS-SEC, this measure is augmented with data on parental education (whether or not parents are degree educated) and private/state schooling; two further indicators that might capture other dimensions of an individual's social background.

To combine this individual level data with university and neighbourhood and city-level measures of diversity required a number of additional steps. For the neighbourhood and city level calculations of ethnic diversity, 2011 census data was analysed (Office for National Statistics, National Records of Scotland, & Northern Ireland Statistics and Research Agency, 2016) at the level of Lower Super Output Area (LSOA - median population of 1518 for England and Wales) and Unitary Authority areas (median population 122100). These statistical and governmental geographies have the advantage of being shared across the four nations (England, Wales, Scotland, Northern Ireland) of the UK, unlike some of the smaller or medium sized statistical geographies. For calculating measures of diversity at university level, the data was aggregated to school/university level to provide a proxy for the institutional population. At university level the statistics are for a single cohort only (that entering university in 2014-15), so for universities this excludes previous years of undergraduates and postgraduates. In both cases these figures are imperfect, with the possibility of our cohort being unrepresentative, but for an analysis which is centred on entry to university these institutional statistics still provide a useful indication of ethnic composition. We also seek to explore differences in race and ethnicity across the UK and we do not control for home region or the different university tuition fee systems in different parts of the UK; in a recent report we have explored the effect of English fee rises in 2012 on students' mobility decisions, controlling for both ethnicity and region/nation of origin (Authors, 2018).

In terms of the methods used to calculate diversity, we have used Theil's (Theil & Finizza, 1971) relative entropy index which provides a measure of the homogeneity (a single, ethnic, group dominates) or heterogeneity (all groups are evenly balanced) of populations across different geographies and institutions. The score varies between 0 (totally homogeneous) and 1 (totally heterogeneous) and was calculated using the open source geo-segregation analyser tool (Apparicio, Martori, Pearson, Fournier, & Apparicio, 2014). There are various measures of diversity and segregation and there is considerable debate about the advantages and disadvantages of various methods in measuring school-level segregation (Allen & Vignoles, 2007; Gorard & Taylor, 2002) and

at the neighbourhood scale (Simpson, 2007). Rather than focus on the isolation of individual ethnic groups, entropy is a robust measure of the evenness of spread of multiple different population groups (Reardon & Firebaugh, 2002). One limitation to this approach is that when institutions or localities are dominated by a single ethnic group giving a low entropy value, it is potentially not possible to distinguish between which group it pertains to. A neighbourhood or university may appear homogeneous without being able to tell *which* group it refers to. For universities and unitary authorities there are relatively few areas or institutions which suffer from this ambiguity, it is thus primarily an issue only for data referring to the neighbourhood scale. Importantly from the point of view of our particular study, what matters is student experience of homogeneity or heterogeneity, that is whether they come from a neighbourhood that is dominated by a single ethnic group, and whether they move away from or towards are more or less homogeneous or heterogeneous locality, city or institution. In some cases where students do not physically relocate to attend university, their movement will represent a short commute and they will be included in the calculation of neighbourhood ethnic diversity for their home neighbourhood or local authority area. This sort of tautology is hard to avoid when using census data with limited flexibility to combine ethnicity and age. However, it ought to be noted that this tautology does not undermine the exercise as our focus here is still to highlight the movement of students between areas and institutions with different ethnic composition. The students included in the 2011 census data represent a single cohort and are unlikely to substantially distort the calculation of ethnic diversity in that particular neighbourhood. Whilst no measure will describe all aspects of diversity or segregation perfectly, Theil's relative entropy meets our requirements in this case.

In the final section of analysis, we use a multi-level modelling (MLM) linear regression method which allows us to go beyond simply accounting for variation at the individual level in whether students move towards universities which are more or less diverse than where they grew up. MLM approaches allow for the controlling of variance at an additional level, so variance is held constant at a second hierarchical level which is a larger institution than the first level. In our case, universities are the second level with students as the first level. This allows us to explore how students' movements towards or away from ethnic diversity is affected by the individual institution attended. We use a Restricted Maximum Likelihood Estimation MLM approach using the open source R software libraries 'sjPlot' (Lüdecke, 2018) and 'lme4' (Bates, Mächler, Bolker, & Walker, 2015; Finch, Bolin, & Kelley, 2014). The 'entropy difference' is the independent variable which the difference between the entropy value of students home neighbourhood and that for the university they attend to. We account for a range of educational and social characteristics and these variables and our methods are described in greater detail below ahead of the model results themselves.

Classifying the ethnic composition of universities and representation of local communities

We begin here by examining the relative entropy values of each university and their surrounding area (See table in appendix). These provide a measure of how evenly balanced the 11 ethnic groups in the classification are across universities in the UK and the government areas (these equivalent areas are known as unitary local authorities in England and Wales, local government districts in Northern Ireland and council areas in Scotland). A value closer to 0 indicates a high concentration of a single ethnic group, a value closer to 1 indicates a more evenly balanced distribution of different populations. The differences between local area entropy scores and university entropy scores are largely correlated with the percentage of the student body that is white. The only notable partial exception to this is the University of Bradford where there is a single large ethnic-minority group (British-Pakistani) which composes around 30% of the student body, leading to a slightly lower entropy value compared to other universities that also have high percentages of students of colour.

The table in the appendix allows us to examine how university subject specialisms, local geographies of race and institutional hierarchies combine to create the racial geography of universities which provides the context for student mobility decisions. We split the entropy scores for all the universities into five quintiles. Universities in the lowest quintile for diversity are mainly the Northern Irish and Scottish universities, the more rural and peripheral Scottish and English universities and the more specialised agricultural and music or arts institutions (See Appendix for table). Both agriculture and the arts/music are occupational fields where people of colour are under-represented, for elite arts and music institutions and especially those in London, the problem of lack of representation is particularly acute given the highly diverse surroundings. In contrast agricultural universities are less often situated in ethnically diverse towns or cities with traditional intakes from predominantly white rural areas. It is notable here that there several universities with lower ethnic diversity are still more ethnically mixed than the towns in which they are situated (e.g. the University of Chester, the University of the West of Scotland and St Andrews). Across the data, universities which are more diverse than their surroundings tend to be in peripheral geographic locations or located close to large cities with ethnic diverse populations. The second least diverse quintile of universities continues to be dominated by Scottish universities, specialist art, music and drama institutions and universities in relatively peripheral geographic locations. A large number of universities in provincial English and Welsh cities fall into the middle quintile and these include a large number of prestigious, research intensive universities founded in the 1960s or earlier. In the quintiles four and five, we can see that the most diverse universities in the UK are predominantly those found in or close to the large multi-cultural cities of Manchester, Birmingham or London as well as those universities serving the former mill

towns of Lancashire and West Yorkshire.[2] Of the 31 most diverse universities, only seven (Newman, Bradford, Birmingham City, Wolverhampton, De Montfort, Coventry and Aston) are not in London or its broader hinterland. With some exceptions then, these results broadly reflect the uneven geography of race and ethnicity across the UK.

Also included in table in the appendix are figures showing the percentage of the University which is white and the percentage of the surrounding local authority areas (council areas in Scotland, district council areas in Northern Ireland) which are white according to the 2011 census. This basic contrast allows us to highlight some important issues representation caused by the geography of student recruitment. It is worth noting here that the more academically selective universities tend to have a more national recruitment pattern which is less reflective of their local areas. Despite the original intention of many older, 19th century provincial universities to serve their local communities economically and socially (Anderson, 2006), many of these universities no longer recruit as many students locally. With post-war migration, these now prestigious, academically selective universities do not always reflect the ethnic diversity of the cities where they are located.

Unsurprisingly what this simple comparison reveals is that the universities which are the least representative of their surrounding areas are elite institutions. Elite institutions with an arts, dance or music specialism are particularly unrepresentative of their local areas. Whilst black and minority ethnic participation has increased slowly at certain music conservatoires in recent years, they remain under-represented (Burke & McManus, 2009; Scharff, 2015, pp. 9-10) and, particularly in London, the elite music and arts schools are sharply detached from, and unrepresentative of, their local areas. Despite being more ethnically diverse than most other large more academically-selective universities, the University of Birmingham is still less diverse than the city itself, with a white intake that is 15.6% higher than the local area. In contrast, the make-up of nearby Birmingham City University and Aston University are much closer to the multi-ethnic population of England's second city. Aston is at the other end of the spectrum to Birmingham University, with an intake which is 26% more diverse (i.e. less white) than the city as a whole. The other universities which are more diverse than their surrounding area are primarily those in London and its broader regional periphery (e.g. St Mary's University Twickenham, University of Surrey) but they also include the universities of Bolton, Salford and Northampton in the Midlands and the North of England. Universities whose intakes are more diverse than their surrounding area highlight particular decision-making processes amongst students from those areas. White students from the local area are not attending these universities

[2] After 1945, the milltowns of West Yorkshire and Lancashire also experienced substantial migration, particularly from Pakistan and the Caribbean, to work in the textile mills of the area.

which instead draw on ethnic-minority students who must, in part at least, come from outside the local area. What then is the effect of growing up in a more or less ethnically diverse local authority area or neighbourhood and how does this play out in students' choices of university?

Neighbourhood diversity and the diversity of university attended

Using the entropy values shown above we can explore the links between neighbourhood diversity and university diversity more closely using some simple cross-tabulations. In the tables below, we use the entropy scores for students' home neighbourhood alongside the university entropy scores seen above (Table 1), with the latter also being compared to student ethnicity (Table 2). For the LSOAs, the lowest two quintiles, are rural areas with the middle quintile being mostly the suburbs or rural areas directly adjacent to large cities and towns, the top two quintiles cover most of the UK's urban areas with the most diverse quintile of neighbourhoods concentrated in the centres of large cities. The quintiles for university entropy score are shown in the table in the appendix.

[Tables 1 and 2 about here]

Taking the comparison of neighbourhood and university diversity first (Table 1), it is worth underlining one very broad point which is suggested by the table, namely that for the majority of students the university they attend is more diverse than the neighbourhood they grew up in. For students from neighbourhoods in the lowest two quintiles for ethnic diversity (entropy values between 0 and 0.076), the overwhelming majority will attend universities which are more diverse than where they grew up. In fact, there are only six universities with lower diversity scores than these neighbourhoods, all of these universities are either in Northern Ireland, which has fewer people of colour compared to other parts of the UK, or are agricultural universities. These six universities have a total population of just 5690 compared to a total of 141055 students from neighbourhoods in the lowest two quintiles for ethnic diversity (see appendix). In the dataset as a whole 83% of students attend a university with a higher entropy score than the neighbourhood they grew up in. Given the geography of race in the UK, and the concentration of ethnic-minority populations in large cities with other more rural and/or peripheral areas being overwhelmingly white, this finding is not surprising. Nevertheless, superficially at least, universities are places where there is greater *potential* for encountering and experiencing the different ethnicities of British young people than in the more segregated home neighbourhoods where students grew up. This simple point also allows greater

insight into the contexts in which racism occurs in a university setting – a significant number of students will come to university with no or little experience of mixing with people of different backgrounds on an everyday basis. It also reveals how the decision to move for university has very different implications for students of colour. If they are attending a less ethnically diverse university, they are also likely to be choosing a university where many white students will have little knowledge or experience of living in ethnically mixed areas.

Despite this broad point about the greater diversity of universities as a whole, Table 1 still suggests that there may be a significant link between neighbourhood diversity and the diversity of the university attended. Students from the least diverse quintile of neighbourhoods tend to be concentrated in the lowest three quintiles of universities. The percentage of students from the least diverse fifth of neighbourhoods attending the least diverse group of universities is 2.14 times higher than the national percentage of students attending the least diverse group of universities across the UK as a whole. This ratio falls consistently as we move along the row of students in the least diverse fifth of UK neighbourhoods. For the most diverse fifth of neighbourhoods the opposite pattern is true, as the diversity of the university increases the percentage of students from these neighbourhoods increases. These patterns suggest that, without controls for attainment, distance to university and region of origin, the most diverse universities in the country tend to recruit from the most diverse neighbourhoods. The racial segregation of different neighbourhoods is thus associated with where and how students decide to go to university. The precise nature of this relationship is not clear from this table and these patterns could well be driven by the differential tendency of students to migrate for university which varies by class (Holdsworth, 2009), ethnicity and gender (Khambhaita & Bhopal, 2015), with distance being particularly prohibitive in determining where students study for Bangladeshi-background girls (Gibbons & Vignoles, 2012). These findings also reflect the geography of the UK with working-class students, whether students of colour or white, tending to stay local (Authors, 2018), thus reinforcing the broader uneven geographies of race in the UK. Whether these are students in multicultural Bradford or Birmingham or in peripheral, white-dominated rural areas in Northern Ireland, the tendency to stay local reinforces these geographies of race in the composition of certain universities. We will begin to try and account for potentially confounding variables in the model below, but first we will examine the relationship between university diversity and students' ethnicity.

To provide an initial examination of this link between student ethnicity and the ethnic composition of universities, Table 2 compares the number of students from particular ethnic backgrounds with the diversity of the university attended. Unsurprisingly for most minority groups, the largest numbers of

students attend the most diverse group of universities. These two variables are not independent so this pattern is to be expected, nonetheless there is significant variation amongst different ethnic groups. In line with other trends suggesting a different position amongst communities of colour within the education system, British-Indian and especially British-Chinese are the least concentrated in the most diverse universities and tend to be more balanced across different universities. In contrast, students from Bangladeshi backgrounds, followed by students from Afro-Caribbean backgrounds, have the highest percentage of any group in the most diverse quintile of universities. Given that existing research has previously highlighted Bangladeshi students as being particularly unlikely to be spatially mobile (Gibbons & Vignoles, 2009) and the presence of a large Bangladeshi community in London, this finding is perhaps unsurprising. It also underlines the need to account for the effect of distance travelled and whether or not students live at home when modelling the data.

Modelling student movements towards more or less diverse institutions than where they grew up

Modelling how university ethnic composition and the ethnic composition of where students grow up are linked is not straightforward. Simply using the diversity score of the university as the dependent variable would have the effect of giving each student the same value, thus invalidating standard errors and other parameters of the model which assume that the dependent variable will vary by each individual in the sample population. We also wanted to explore whether students were moving to institutions which were more or less diverse than the area they grew up in. For this reason we computed a new dependent variable, the entropy difference, by simply subtracting a students' home neighbourhood entropy score from the entropy score of the university they attended. If students were moving towards a more diverse university than their home neighbourhood the value would be positive, it students were moving towards a less diverse university than their home neighbourhood the value would be negative. To illustrate this, let us take the real example a student moving from the rural Scottish Borders to study at an ethnically diverse university in the South-East of England. The student moved from an area with an entropy score of just 0.038 to a south-eastern university with an entropy score of 0.68, giving them an entropy difference of 0.642. In sharp contrast, one student from East London moved from an LSOA with an entropy of 0.73 to a northern English university with an entropy score of just 0.10, an entropy difference of -0.63. Most students fell somewhere in between this range of values, as shown by the summary statistics shown below. The median value of 0.16 (See Table 3) is in line with findings discussed below which suggest that most students will move towards a more diverse university than the neighbourhood they have grown up in (reflecting the geographic distribution of ethnic groups in the UK).

[Table 3 here]

The results that follow (See Table 4) allow an indication of how decisions about where to study in relation to ethnic mix are affected by where students grow up, the ethnic composition of the university and the ethnic composition of the university's locality. We include here models which take universities as the second level of the model. This allows us to explore how students' movements between more or less diverse institutions than their home neighbourhood vary across different, specific universities. The variables included as fixed effects were those found to provide the best fit through a gradual process of elimination of other variables by testing the log likelihood of each run. The models included below begin by examining entropy differences by ethnicity, then sequentially adding in social class and gender, distance from home, whether or not a student is living at home or not and finally attainment. In each case, university is included at the second level.

[Table 4 here]

The results from these models suggest that it is white students who make the greatest moves towards more diverse universities than where they have grown up. All the ethnic-minority groups have an entropy difference of between -0.12 and -0.33 lower than their white peers and these effects vary very little even after other variables are introduced. This suggests that white students are much more likely to be moving towards a university that is more diverse than where they have grown up than their fellow students from ethnic-minority backgrounds. Given that most ethnic-minority students tend to live in more diverse neighbourhoods than their white peers this is perhaps not surprising. This underlines the extent to which it is white students who are on the whole moving towards universities that are more diverse than where they grow up. There is also considerable variation between different ethnic-minority groups with Chinese-background students considerably closer to their white peers than other students of colour. Pakistani and Bangladeshi-heritage students are the least likely to move towards more diverse universities compared to white students. This reflects their greater geographic concentration in diverse neighbourhoods and their proximity to particular highly diverse universities like Bradford and Queen Mary's in London.

The other variables at the individual level have a relatively limited effect on entropy difference. Being female has a very small positive effect on the entropy difference, and social class also has similarly small effects though notably students from long-term unemployed families tend to move to slightly less diverse universities than their more affluent peers (-0.06). This small effect only reduces very slightly once distance and whether or not a student is living at home are introduced to the model, neither of which have a considerable effect. Attainment also seems to have relatively little effect, with just a slight positive increase in entropy difference as attainment increases. At the second level university attended accounts for a large proportion of the outcome variance, the intra class coefficient

(ICC) suggests that between 0.508 (Model 1) and 0.519 (Model 3) of the total variance is explained by variation between groups, in this case universities. There are considerable university-level effects which, unsurprisingly, closely match the university diversity scores seen above; we will describe these institutional coefficients briefly here. Moving away from diverse neighbourhoods is most associated with elite art, drama and musical institutions, agricultural and veterinary institutes and universities in the geographical periphery of the UK, away from the main English cities. These institutions tend to have coefficients at the second level of -0.2 or less indicating a significant move *away* from diversity for most students. Conversely it is students attending universities in London who will tend to move towards a more diverse institution than where they grew up (coefficients of 0.2 or higher). These individual coefficients at the institutional level have effects of similar magnitude to students' ethnicity, with introducing other individual-level variables only increasing the total variance explained by 0.011 (0.519-0.508). Further investigation of these university level effects, as well as examining other second level effects such as home neighbourhood, former school/college and the local authority area of the university provides rich potential for future work. The central finding here, is that these trajectories between more or less ethnically mixed neighbourhoods and institutions are not strongly affected by attainment or other social characteristics. It is students' ethnicity and the university they attend that are key to determining whether they move towards or away from diverse neighbourhoods.

Conclusion: student mobility and the contemporary politics of race in UK higher education

For the first time, we have provided here a quantitative analysis of students' trajectories in terms of how the ethnic composition of where students grow up is linked to where they attend university. Previous qualitative research (Ball et al., 2002; Clayton et al., 2009) had highlighted how student perceptions of ethnic mix at particular institutions, or the lack thereof, played an important role in student decision-making when deciding about where to study. Students coming from ethnically diverse schools and neighbourhoods wanted to study at a university where they would not stand out and where there would be others like them. Rooting our analysis of student migrations in this earlier qualitative work allows us to provide a novel theoretical slant to previous quantitative work examining spatial transitions to and from university (Faggian et al., 2006, 2007). By contextualising our paper within the qualitative literature, we enable the link to be made between large scale quantitative analyses of mobility for university and the micro-level processes that affect decision-making of students of colour in particular. Moreover, unlike previous studies we explore spatial transitions to university specifically in relation to the ethnic composition of the places where young people grew up. On the one hand, our analysis allows us to model how racialised geographies and the

differentiated intakes of different universities affect higher education decision-making. On the other, within the literature of spatial transitions/internal migration over the life course, we extend analyses of ethnic-minority mobility and higher education. We quantify the complexity and the difficulties faced by students of colour when they consider *where* to study and embed our analysis of the transition to university within an understanding of local and institutional geographies of race.

Given the heightened political tensions around race in higher education in the current political conjuncture both nationally and internationally, it should not be forgotten that universities are diverse institutions, with most students moving *towards* a more diverse university than where they have grown up. Universities provide the *potential* to operate as sites where the rich and changing culture of the UK is represented, experienced and created. Clearly this is far from being the case at present and the realities of campus life, even in ethnically mixed universities and cities, underline the depth of racial divisions that exist within British higher education and society more broadly. Segregation occurs right across student life with substantial segregation by subject studied (Gamsu & Donnelly, 2017a) as well within students unions and societies (Andersson, Sadgrove, & Valentine, 2012; Brooks, Byford, & Sela, 2015). Nevertheless, they provide the possibility of spaces where the 'mongrel', hybrid nature of British culture can be explored and co-produced (Hall, 1992; Rushdie, 1990; Sandercock & Lyssiotis, 2003). However, as we have shown here it is white students who are, controlling for attainment, demographic and geographic characteristics related to their university choice, more likely to move towards a diverse institution. In contrast, relative to their white peers, students of colour of all backgrounds are likely to have an entropy difference which is substantially lower. This underlines how ethnic-minority students tend to either stay at universities which have a similar level of diversity to where they have grown up, whereas white students will likely be moving towards a more diverse university than their home neighbourhood. These contrasting tendencies are crucial to understanding how race is experienced in contemporary university life.

The experience of race and racism in UK higher education is formed through the different racialised geography of university trajectories of students as they move between home and university. For white students moving from peripheral areas, attending university is likely to involve studying in an institutional setting which is more ethnically mixed than where they have grown up. As large parts of Britain are not ethnically diverse, on average most students will be attending universities that are more ethnically mixed than where they have grown up. Relative to their white peers, students of colour are far more likely to be attending a university which is less ethnically diverse than the predominantly urban multi-cultural areas where they have grown up. This highlights how ethnic-minority students simultaneously face at least two additional challenges compared to their white

peers. If students choose to go to a university outside the main English cities or to an elite arts or other specialised institution, they will face an environment which is ethnically very different from the one they have grown up in. At the same time, they may also have to deal with the reactions of white students who may well have had no experience of the multi-ethnic culture of Britain as it exists primarily in the large cities. Given these choices, differences in applicant success by ethnicity (Boliver, 2016), and the cultural and political context of race relations in the era of Trump and Brexit (Virdee & McGeever, 2017), it is little surprise that many students of colour prefer to stay at a local university, often with lower entry requirements, where they will not be made to feel out of place. This puts the onus on universities, especially those situated in white-dominated areas or which have a predominantly white intake, to think through how students of colour experience campus life. Whilst there are now more students of colour in UK higher education than twenty years ago, albeit unevenly distributed across universities of differing prestige (Raffe & Croxford, 2015, p. 330), they are not represented in their staff nor in the curricula of many more conventional programmes of study (Peters, 2015). This paper thus highlights the two major problems with the unequal geography of race in UK higher education: on the one hand the concentration of students of colour in under-funded, less prestigious in large cities, on the other hand the whiteness of more provincial universities in small towns and elite institutions (particularly those specialised in music and arts). These are structural inequalities which affect both campus life and graduate outcomes on the labour market; simple calls for greater diversity of elite institutions are insufficient and risk overlooking the majority of students of colour who remain in newer, less prestigious city universities (Gamsu & Donnelly, 2017b). Traditional long-distance moves to attend a prestigious university in predominantly white towns away from the diversity of large UK cities is not only a middle-class phenomenon (Holdsworth, 2009), they are spatial trajectories which are racialised. The student migration literature both in the UK and internationally has not given sufficient attention to how we can understand the racialised geographies which students must traverse when deciding about where to study.

In this context, further research on the experiences of students who move from highly diverse neighbourhoods in large cities to white-dominated more peripherally-located universities and from white-dominated areas to more diverse universities is key. Qualitative research on student mobilities is an expanding area of research within both geography and education. Our analysis has highlighted the scale of ethnic-minority students' tendency to opt for universities which are less diverse than where they have grown up. In the current climate, that is not surprising. Exploring the experiences of students from ethnic-minority backgrounds who do make these socio-spatial journeys from more diverse cities to white campuses means responding to and potentially aligning our research with the demands of students for change to curricula and an end to forms of everyday racism in campus life (Page, 2014). Research could also explore and ultimately seek to change the expectations of white

students moving to universities and courses which are more ethnically mixed than where they have grown-up. Without understanding, and potentially changing, attitudes of these students, making universities away from the large cities more accommodating to students from ethnically-mixed neighbourhoods will be very difficult. Overcoming this separation between our research and the politics of race in higher education also means attending to the structural inequalities between universities that concentrate working-class ethnic-minority students in the least well-funded universities. The student migration literature ultimately cannot avoid examining the structural inequalities of the uneven geography of race; this paper has sought to make explicit how the institutional geography of race and the ethnic-composition of where students grow up combine to reinforce inequalities within the transition to higher education. We have argued elsewhere (Gamsu & Donnelly, 2017b) that only through a politics of structural transformation of inequalities between different universities are the inequalities of race in UK higher education likely to change. These problems created through residential and institutional segregation are by no means limited to the UK and pose questions for universities internationally. Future research exploring how students' spatial trajectories to university are embedded in institutional and urban geographies of race could contribute the evidence for the structural shift in resources and attitudes that is needed.

Acknowledgements

Thanks to Andres Sandoval-Hernandez, Daniel Miranda and three anonymous reviewers for their comments and suggestions on this paper.

Disclosure statement

No potential conflict of interest was reported by authors.

Funding

The analyses presented here forms part of a wider programme of work funded by the Economic and Social Research Council (ESRC) (grant number ES/N002121/1) which addresses spatial and social (im)mobilities through UK higher education.

References

Allen, R., & Vignoles, A. (2007). What should an index of school segregation measure? *Oxford Review of Education, 33*(5), 643-668. doi:10.1080/03054980701366306

Anderson, R. (2006). *British universities past and present*. London: Bloomsbury Publishing.

Andersson, J., Sadgrove, J., & Valentine, G. (2012). Consuming campus: geographies of encounter at a British university. *Social & Cultural Geography, 13*(5), 501-515. doi:10.1080/14649365.2012.700725

Apparicio, P., Martori, J. C., Pearson, A. L., Fournier, É., & Apparicio, D. (2014). An open-source software for calculating indices of urban residential segregation. *Social Science Computer Review, 32*(1), 117-128.

Ball, S. J., Reay, D., & David, M. (2002). 'Ethnic Choosing': minority ethnic students, social class and higher education choice. *Race ethnicity and education, 5*(4), 333-357.

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting Linear Mixed-Effects Models Using lme4. *2015, 67*(1), 48. doi:10.18637/jss.v067.i01

Boliver, V. (2016). Exploring ethnic inequalities in admission to Russell Group universities. *Sociology, 50*(2), 247-266.

Bonilla-Silva, E., & Forman, T. A. (2000). "I Am Not a Racist But...": Mapping White College Students' Racial Ideology in the USA. *Discourse & society, 11*(1), 50-85.

Brooks, R., Byford, K., & Sela, K. (2015). Inequalities in students' union leadership: the role of social networks. *Journal of Youth Studies, 18*(9), 1204-1218. doi:10.1080/13676261.2015.1039971

Burgess, S., Wilson, D., & Lupton, R. (2005). Parallel lives? Ethnic segregation in schools and neighbourhoods. *Urban Studies, 42*(7), 1027-1056.

Burke, P., & McManus, J. (2009). *Art for a few: Exclusions and misrecognitions in art and design*. London: National Arts Learning Network.

Christie, H. (2007). Higher education and spatial (im) mobility: nontraditional students and living at home. *Environment and Planning A, 39*(10), 2445-2463.

Clayton, J., Crozier, G., & Reay, D. (2009). Home and away: risk, familiarity and the multiple geographies of the higher education experience. *International Studies in Sociology of Education, 19*(3-4), 157-174.

Connor, H., Tyers, C., Modood, T., & Hillage, J. (2004). *Why the difference? A closer look at higher education minority ethnic students and graduates*. London: Stationery Office.

Dotti, N. F., Fratesi, U., Lenzi, C., & Percoco, M. (2013). Local labour markets and the interregional mobility of Italian university students. *Spatial Economic Analysis, 8*(4), 443-468.

Duke-Williams, O. (2009). The geographies of student migration in the UK. *Environment and planning. A, 41*(8), 1826.

Dumangane, C. (2016). *Exploring the narratives of the few: British African Caribbean male graduates of elite universities in England and Wales.* Cardiff University.

Faggian, A., McCann, P., & Sheppard, S. (2006). An analysis of ethnic differences in UK graduate migration behaviour. *The Annals of Regional Science, 40*(2), 461-471.

Faggian, A., McCann, P., & Sheppard, S. (2007). Some evidence that women are more mobile than men: Gender differences in UK graduate migration behaviour. *Journal of Regional Science, 47*(3), 517-539. doi:10.1111/j.1467-9787.2007.00518.x

Finch, W. H., Bolin, J. E., & Kelley, K. (2014). *Multilevel modeling using R*. Boca Ranton, London, New York: CRC Press.

Finn, K. (2017). Multiple, relational and emotional mobilities: Understanding student mobilities in higher education as more than 'staying local'and 'going away'. *British Educational Research Journal, 43*(4), 743-758. doi:10.1002/berj.3287

Finney, N. (2011). Understanding ethnic differences in the migration of young adults within Britain from a lifecourse perspective. *Transactions of the Institute of British Geographers, 36*(3), 455-470.

Finney, N., & Simpson, L. (2008). Internal migration and ethnic groups: evidence for Britain from the 2001 Census. *Population, Space and Place, 14*(2), 63-83.

Gamsu, S., & Donnelly, M. (2017a). *Diverse Places of Learning? Home neighbourhood ethnic diversity and the ethnic composition of universities*. Bath: Institute of Policy Research.

Gamsu, S., & Donnelly, M. (2017b). Oxbridge Diversity is Important, But Inequality in Higher Education Runs Much Deeper Retrieved from http://classonline.org.uk/blog/item/oxbridge-diversity-is-important-but-inequality-in-higher-education-runs-muc

Gibbons, S., & Vignoles, A. (2009). *Access, Choice And Participation In Higher Education*. Retrieved from London: Centre for the Economics of Education, LSE.

Gibbons, S., & Vignoles, A. (2012). Geography, choice and participation in higher education in England. *Regional science and urban economics, 42*(1), 98-113.

Gorard, S., & Taylor, C. (2002). What is segregation? A comparison of measures in terms of 'strong'and 'weak'compositional invariance. *Sociology, 36*(4), 875-895.

Hall, S. (1992). Our mongrel selves. *New Statesman and Society, 5*, 6-8.

Hoare, A., & Corver, M. (2010). The regional geography of new young graduate labour in the UK. *Reg Stud, 44*(4), 477-494.

Holdsworth, C. (2009). 'Going away to uni': mobility, modernity, and independence of English higher education students. *Environment and planning. A, 41*(8), 1849-1864.

Holton, M., & Finn, K. (2017). Being-in-motion: The everyday (gendered and classed) embodied mobilities for UK university students who commute. *Mobilities*, 1-15.

ITV. (2014). Hundreds gather for Luton EDL march. Retrieved from http://www.itv.com/news/anglia/story/2014-11-22/hundreds-gather-for-luton-edl-march/

Johnston, R., Burgess, S., Wilson, D., & Harris, R. (2006). School and residential ethnic segregation: An analysis of variations across England's local education authorities. *Reg Stud, 40*(9), 973-990.

Khambhaita, P., & Bhopal, K. (2015). Home or away? The significance of ethnicity, class and attainment in the housing choices of female university students. *Race ethnicity and education, 18*(4), 535-566.

Lüdecke D (2018). *sjPlot: Data Visualization for Statistics in Social Science*. doi: 10.5281/zenodo.1308157, R package version 2.6.0, https://CRAN.R-project.org/package=sjPlot.

Liu, Y., & Xu, W. (2017). Destination choices of permanent and temporary migrants in China, 1985–2005. *Population, Space and Place, 23*(1), e1963.

Mulder, C. H., & Clark, W. A. (2002). Leaving home for college and gaining independence. *Environment and Planning A, 34*(6), 981-999.

Office for National Statistics, National Records of Scotland, & Northern Ireland Statistics and Research Agency. (2016). *2011 Census aggregate data (Edition: June 2016)*.

Page, L. Y.-P., Abby. (2014, 14th March 2014). How widespread is racism at uni?, Blog. *The Guardian*. Retrieved from https://www.theguardian.com/education/abby-and-libby-blog/2014/mar/14/students-racism-on-campus-awareness-campaign

Peters, M. A. (2015). Why is My Curriculum White? *Educational Philosophy and Theory, 47*(7), 641-646.

Raffe, D., & Croxford, L. (2015). How stable is the stratification of higher education in England and Scotland? *British Journal of Sociology of Education, 36*(2), 313-335.

Rangvid, B. S. (2007). Living and learning separately? Ethnic segregation of school children in Copenhagen. *Urban Studies, 44*(7), 1329-1354.

Reardon, S. F., & Firebaugh, G. (2002). Measures of Multigroup Segregation. *Sociological methodology, 32*(1), 33-67.

Rose, D., Pevalin, D. J., & O'Reilly, K. (2005). *The National Statistics Socio-economic Classification: origins, development and use*: Palgrave Macmillan Basingstoke.

Rushdie, S. (1990). In good faith: a pen against the sword. *Newsweek, 115*(7), 52-57.

Sage, J., Evandrou, M., & Falkingham, J. (2013). Onwards or Homewards? Complex Graduate Migration Pathways, Well-being, and the 'Parental Safety Net'. *Population, Space and Place, 19*(6), 738-755. doi:doi:10.1002/psp.1793

Sandercock, L., & Lyssiotis, P. (2003). *Cosmopolis II: Mongrel cities of the 21st century* London: Bloomsbury Press

Savage, M. (2000). *Class analysis and social transformation*: Open University Press Buckingham.

Scharff, C. (2015). *Equality and diversity in the classical music profession*. Retrieved from London: http://blogs.kcl.ac.uk/young-female-and-entrepreneurial/files/2014/02/Equality-and-Diversity-in-the-Classical-Music-Profession.pdf

Simpson, L. (2007). Ghettos of the mind: the empirical behaviour of indices of segregation and diversity. *Journal of the Royal Statistical Society: Series A (Statistics in Society), 170*(2), 405-424. doi:10.1111/j.1467-985X.2007.00465.x

Simpson, L., & Finney, N. (2009). Spatial patterns of internal migration: evidence for ethnic groups in Britain. *Population, Space and Place, 15*(1), 37-56.

Theil, H., & Finizza, A. J. (1971). A note on the measurement of racial integration of schools by means of informational concepts. *Journal of Mathematical Sociology,* 1:2, 187-193, DOI: 10.1080/0022250X.1971.9989795

Virdee, S., & McGeever, B. (2017). Racism, Crisis, Brexit. *Ethnic and Racial Studies*, 1-18.

Warikoo, N. K., & de Novais, J. (2015). Colour-blindness and diversity: race frames and their consequences for white undergraduates at elite US universities. *Ethnic and Racial Studies, 38*(6), 860-876. doi:10.1080/01419870.2014.964281

Warikoo, N. K., & Deckman, S. L. (2014). Beyond the Numbers: Institutional Influences on Experiences With Diversity on Elite College Campuses. *Sociological Forum, 29*(4), 959-981. doi:10.1111/socf.12128

Tables

Table 1 University entropy compared to the entropy of students' home neighbourhoods.

Home Neighbourhood Entropy Score	*University Entropy Score*					*Row total (n)*
	Quintile 1: 0.0107-0.18091	Quintile 2: 0.18092-0.2436	Quintile 3: 0.2437-0.37011	Quintile 4: 0.37012-0.58567	Quintile 5: 0.58568-0.8613	
Quintile 1: 0-0.0444	23.7 %	31.9%	23.5%	15.7%	5.1%	66730
Quintile 2: 0.0445-0.076	15.9%	22.9%	28.9%	23.9%	8.4%	74325
Quintile 3: 0.077-0.1418	11.8%	19.2%	29.6%	28.2%	11.3%	77640
Quintile 4: 0.1419-0.3194	7.8%	14.5%	27.6%	31.5%	18.5%	81155
Quintile 5: 0.3195-0.8757	2.4%	6.1%	15.7%	29.4%	46.4%	112845
Column total (n)	45930	71830	100190	108910	85830	412700

Note: Table shows the row percentages for students from neighbourhoods of different levels of ethnic diversity attending university. Numbers are rounded to multiples of five so totals may not sum exactly.

Table 2 Entropy score of university attended by student ethnic background

Student Ethnicity	*University Entropy Score*					*Row total (n)*
	Quintile 1: 0.0107-0.18091	Quintile 2: 0.18092-0.2436	Quintile 3: 0.2437-0.37011	Quintile 4: 0.37012-0.58567	Quintile 5: 0.58568-0.8613	
1. White	13.9%	21%	27.3%	25.4%	12.4%	309575

2. Black/Black British - Caribbean	0.01%	4.1%	9.8%	28%	56.7%	6860
3. Black/Black British - African	0.02%	4.9%	11.9%	30.3%	50.8%	22965
4. Other Black background	2.3%	5.3%	11.2%	30.3%	50.8%	1585
5. Asian/Asian British - Indian	2%	4.9%	15.8%	30.9%	46.4%	13990
6. Asian/Asian British - Pakistani	2.9%	7.6%	11.8%	30.5%	47.3%	13670
7. Asian/Asian British - Bangladeshi	1.6%	3.9%	9.5%	21%	64%	5780
8. Chinese	4.6%	11.9%	23.9%	30.7%	29%	3470
9. Other Asian background	2.9%	6.6%	15.4%	25.4%	49.7%	8580
99. Other (including mixed)	4.2%	9.2%	21.1%	29.2%	36.2%	22440
999. Ethnicity not known	4.7%	12.5%	18.7%	38.6%	25.6%	3800
Column total (n)	45930	71830	100190	108910	85830	412700

Note: Table shows the row percentages for each ethnic group attending universities of different levels of ethnic diversity. Numbers are rounded to multiples of five so totals may not sum exactly.

Table 3 Summary statistics for entropy difference (home neighbourhood entropy score - university entropy score)

	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
Entropy Difference	-0.7501	0.059	0.1669	0.1703	0.2885	0.8534

Table 4 Models of entropy difference of students home to university trajectory with university attended as random effect

Note: ** indicates significance down to the p <0.001 level, non-asterisked values are non-significant. Confidence Interval (CI) is 95%.

	Model 1		Model 2		Model 3		Model 4	
	B	*CI*	*B*	*CI*	*B*	*CI*	*B*	*CI*
Fixed Parts								
(Intercept)	0.2**	0.18 – 0.23	0.21**	0.19 – 0.24	0.21**	0.19 – 0.24	0.2**	0.17 – 0.23
Ethnicity (base=white)								
Black/Black British - Caribbean	-0.3**	-0.31 – -0.30	-0.3**	-0.31 – -0.30	-0.3**	-0.31 – -0.30	-0.3**	-0.30 – -0.30
Black/Black British - African	-0.27**	-0.27 – -0.27	-0.27**	-0.27 – -0.27	-0.27**	-0.27 – -0.27	-0.27**	-0.27 – -0.26
Other Black background	-0.28**	-0.29 – -0.27	-0.28**	-0.29 – -0.27	-0.28**	-0.29 – -0.27	-0.28**	-0.28 – -0.27
Asian/Asian British - Indian	-0.28**	-0.29 – -0.28	-0.28**	-0.29 – -0.28	-0.28**	-0.28 – -0.28	-0.28**	-0.28 – -0.28
Asian/Asian British - Pakistani	-0.33**	-0.33 – -0.33	-0.32**	-0.33 – -0.32	-0.32**	-0.32 – -0.31	-0.32**	-0.32 – -0.31
Asian/Asian British - Bangladeshi	-0.32**	-0.32 – -0.31	-0.31**	-0.31 – -0.30	-0.3**	-0.30 – -0.30	-0.3**	-0.30 – -0.29
Chinese	-0.12**	-0.13 – -0.12	-0.12**	-0.13 – -0.12	-0.12**	-0.13 – -0.12	-0.12**	-0.13 – -0.12
Other Asian background	-0.26**	-0.26 – -0.25	-0.25**	-0.26 – -0.25	-0.25**	-0.25 – -0.25	-0.25**	-0.25 – -0.25
Other (including mixed)	-0.18**	-0.18 – -0.18	-0.18**	-0.18 – -0.18	-0.18**	-0.18 – -0.18	-0.18**	-0.18 – -0.18
Ethnicity not known	-0.14**	-0.14 – -0.13	-0.13**	-0.14 – -0.13	-0.13**	-0.14 – -0.13	-0.13**	-0.13 – -0.12
Gender (base=male)								
Female			0.01**	0.00 – 0.01	0.01**	0.00 – 0.01	0**	0.00 – 0.01
Non-binary			0.02	-0.02 – 0.07	0.02	-0.02 – 0.06	0.02	-0.02 – 0.06
Social class - NS-SEC (base= Higher managerial & professional occupations)								
Lower managerial, administrative & professional occupations			0**	-0.01 – -0.00	0**	-0.01 – -0.00	0**	-0.01 – -0.00
Intermediate occupations			-0.02**	-0.02 – -0.01	-0.01**	-0.02 – -0.01	-0.01**	-0.02 – -0.01
Small employers & own account workers			-0.02**	-0.02 – -0.01	-0.01**	-0.02 – -0.01	-0.01**	-0.02 – -0.01
Lower supervisory & technical occupations			-0.01**	-0.01 – -0.01	-0.01**	-0.01 – -0.00	-0.01**	-0.01 – -0.00
Semi-routine occupations			-0.02**	-0.02 – -0.02	-0.02**	-0.02 – -0.02	-0.02**	-0.02 – -0.02
Routine occupations			-0.03**	-0.04 – -0.03	-0.03**	-0.03 – -0.03	-0.03**	-0.03 – -0.03
Never worked & long-term unemployed			-0.06**	-0.06 – -0.05	-0.05**	-0.06 – -0.05	-0.05**	-0.06 – -0.04

Not recorded		-0.03**	-0.03 – -0.03	-0.03**	-0.03 – -0.02	-0.02**	-0.02 – -0.02
Missing		-0.01**	-0.02 – -0.01	-0.01**	-0.02 – -0.01	-0.01**	-0.01 – -0.01
Distance from home (kilometers)				0**	0.00 – 0.00	0**	0.00 – 0.00
Living at home (base=not living at home)				-0.02**	-0.02 – -0.02	-0.02**	-0.02 – -0.02
Attainment (UCAS points, base=lowest quintile)							
Quintile 2						0.01**	0.01 – 0.01
Quintile 3						0.01**	0.01 – 0.01
Quintile 4						0.02**	0.02 – 0.02
Quintile 5 (highest)						0.03**	0.03 – 0.03
Not required for entry						0	-0.00 – 0.00
Not recorded						0.01**	0.00 – 0.01
Random Parts (University as second level)							
σ^2	0.025	0.025		0.025		0.025	
$\tau_{00,\ Label}$	0.026	0.026		0.027		0.027	
N_{Label}	154	154		154		154	
ICC_{Label}	0.508	0.511		0.517		0.519	
Observations	412697	412697		412697		412697	
R^2 / Ω_0^2	.442 / .442	.445 / .445		.447 / .447		.449 / .449	

Appendix

Ethnic composition of universities (for cohort entering university in 2014-15) compared to surrounding local authority (LA) area (ONS Census, 2011)

University name	University Entropy Quintile	Entropy value of university	Entropy value (local authority area of university)	University (% White)	Local authority area of university (% White)
St Mary's University College	1	0.01	0.10	99.61	97.72
Stranmillis University College		0.02	0.10	99.35	97.72
Harper Adams University		0.03	0.17	98.90	92.56
Royal Agricultural University		0.06	0.07	97.21	97.72
The Queen's University of Belfast		0.07	0.10	97.30	96.36
SRUC		0.07	0.20	96.67	91.64
University of the Highlands and Islands		0.08	0.05	96.95	98.52
Bishop Grosseteste University		0.08	0.12	96.55	95.47
University of St Mark and St John		0.09	0.10	96.58	96.09
York St John University		0.10	0.15	96.08	94.15
Writtle College		0.10	0.16	95.26	93.74
Royal Conservatoire of Scotland		0.10	0.25	95.15	88.35
The University of Stirling		0.12	0.09	95.07	96.76
Plymouth College of Art		0.13	0.10	94.53	96.09
The Liverpool Institute for Performing Arts		0.13	0.24	93.79	88.87
Royal Academy of Music		0.14	0.61	92.98	61.65
Courtauld Institute of Art		0.14	0.61	89.58	61.65
Royal Northern College of Music		0.14	0.55	92.54	66.50
Edinburgh Napier University		0.15	0.20	93.65	91.64
Falmouth University		0.15	0.06	92.74	98.11
University of Abertay Dundee		0.15	0.15	93.16	93.95
Bath Spa University		0.15	0.14	92.86	94.55
The Robert Gordon University		0.16	0.19	92.93	91.76
Edge Hill University		0.17	0.05	92.77	98.11
Bangor University		0.17	0.10	92.39	96.35
Aberystwyth University		0.17	0.09	92.23	96.64
Liverpool Hope University		0.17	0.24	91.87	88.87
University of Northumbria at Newcastle		0.18	0.31	92.44	85.44
University of Chester		0.18	0.08	92.32	97.33
The University of the West of Scotland		0.18	0.08	92.04	97.23
The University of St Andrews		0.18	0.07	91.76	97.55
The University of Edinburgh	2	0.18	0.20	91.42	91.64
The University of Chichester		0.18	0.09	91.69	96.74

University of Wales Trinity Saint David		0.19	0.06	91.66	97.94
The University of Glasgow		0.19	0.25	91.38	88.35
Queen Margaret University, Edinburgh		0.19	0.05	91.30	98.28
University of Newcastle-upon-Tyne		0.20	0.31	90.93	85.44
The Royal Veterinary College		0.20	0.56	89.97	66.21
University of Gloucestershire		0.20	0.14	90.85	94.20
Leeds College of Art		0.20	0.31	90.56	85.01
Norwich University of the Arts		0.20	0.21	90.38	90.74
The University of Lincoln		0.20	0.12	90.71	95.47
The University of Dundee		0.20	0.15	90.69	93.95
University of Ulster		0.20	0.05	90.91	98.26
Rose Bruford College		0.20	0.34	89.36	81.61
The University of Exeter		0.20	0.17	90.46	92.97
University of Plymouth		0.21	0.10	90.40	96.09
Glasgow Caledonian University		0.21	0.25	90.03	88.35
Glyndwr University		0.21	0.09	90.29	96.81
Royal College of Music		0.21	0.61	88.16	61.65
Liverpool John Moores University		0.21	0.24	89.91	88.87
The University of Strathclyde		0.21	0.25	89.84	88.35
University of South Wales		0.22	0.08	89.59	97.35
Guildhall School of Music and Drama		0.23	0.41	87.32	78.59
University of Cumbria		0.23	0.06	89.66	97.92
Trinity Laban Conservatoire of Music and Dance		0.23	0.55	88.04	62.29
Teesside University		0.23	0.25	89.20	88.12
The University of Aberdeen		0.23	0.19	89.31	91.76
Glasgow School of Art		0.23	0.25	87.89	88.35
University of Worcester		0.23	0.16	89.05	93.33
Leeds Trinity University		0.24	0.31	87.98	85.01
Heriot-Watt University		0.24	0.20	88.37	91.64
The University of Winchester	3	0.25	0.12	88.26	95.47
Swansea University		0.26	0.15	87.61	93.97
The Arts University Bournemouth		0.26	0.11	85.93	95.71
The University of York		0.26	0.15	87.08	94.15
The University of Sunderland		0.26	0.11	87.39	95.90
Cardiff University		0.26	0.33	87.22	84.54
University of Durham		0.27	0.06	86.53	98.06
University Campus Suffolk		0.27	0.24	85.56	88.80
The University of Bristol		0.28	0.32	85.26	83.89
The University of Bath		0.28	0.14	85.63	94.55
Sheffield Hallam University		0.28	0.33	85.90	83.62
The University of Hull		0.29	0.15	85.75	94.01

Cardiff Metropolitan University		0.29	0.33	85.73	84.54
Conservatoire for Dance and Drama		0.29	0.56	81.07	66.21
Bournemouth University		0.29	0.11	85.41	95.71
The University of Sheffield		0.29	0.33	85.37	83.62
The University of Liverpool		0.30	0.24	85.02	88.87
The University of Lancaster		0.30	0.12	84.56	95.40
University of the West of England, Bristol		0.31	0.13	84.75	94.88
The University of Leeds		0.31	0.31	83.93	85.01
The University of East Anglia		0.32	0.21	83.89	90.74
The University of Oxford		0.32	0.43	82.56	77.59
The Royal Central School of Speech and Drama		0.34	0.56	79.80	66.21
Loughborough University		0.34	0.26	82.02	87.32
Leeds Beckett University		0.34	0.31	81.67	85.01
The University of Sussex		0.35	0.24	80.78	89.01
Southampton Solent University		0.36	0.30	80.29	85.78
The University of Southampton		0.36	0.30	80.85	85.78
Oxford Brookes University		0.36	0.43	81.08	77.59
The University of Reading		0.37	0.25	80.23	88.25
The University of Cambridge	4	0.37	0.35	79.18	82.42
Canterbury Christ Church University		0.37	0.17	78.17	92.79
University of Derby		0.38	0.37	79.24	80.18
University of Nottingham		0.38	0.49	78.99	71.44
Staffordshire University		0.40	0.13	78.65	94.90
The University of Keele		0.40	0.13	78.26	94.95
The Nottingham Trent University		0.41	0.49	77.01	71.44
The University of Brighton		0.42	0.24	75.85	89.01
The University of Manchester		0.44	0.55	74.69	66.50
The Manchester Metropolitan University		0.45	0.55	73.84	66.50
The University of Central Lancashire		0.46	0.35	73.50	80.10
Heythrop College		0.46	0.50	73.91	70.53
The University of Birmingham		0.46	0.63	73.50	57.89
The University of Portsmouth		0.46	0.26	73.20	88.32
The University of Huddersfield		0.47	0.36	69.55	79.09
University for the Creative Arts		0.48	0.11	71.69	95.87
The University of Warwick		0.48	0.46	71.18	73.79
Royal Holloway and Bedford New College		0.48	0.25	71.53	88.70
University of the Arts, London		0.49	0.56	70.17	66.21
St Mary's University, Twickenham		0.51	0.29	68.44	85.90
The University of Salford		0.52	0.22	68.77	90.06
The University of Surrey		0.52	0.22	68.71	90.55

The University of Northampton		0.54	0.31	63.68	84.45
The University of Kent		0.54	0.17	65.89	92.79
Anglia Ruskin University		0.54	0.16	65.86	93.74
Ravensbourne		0.55	0.55	65.17	62.29
Goldsmiths College		0.56	0.58	64.12	53.46
The University of Essex		0.57	0.19	61.97	92.00
The University of Leicester		0.57	0.62	63.12	50.39
The University of Bolton		0.58	0.33	60.45	81.81
Buckinghamshire New University		0.58	0.35	61.07	81.20
Newman University	5	0.59	0.63	57.72	57.89
University College London		0.62	0.56	59.16	66.21
Imperial College of Science, Technology &Medicine		0.63	0.61	56.04	61.65
King's College London		0.63	0.61	58.34	61.65
The University of Bradford		0.64	0.47	32.09	67.35
London School of Economics & Political Science		0.65	0.61	54.72	61.65
Birmingham City University		0.66	0.63	55.23	57.89
The University of Wolverhampton		0.67	0.50	53.44	67.93
De Montfort University		0.67	0.62	50.12	50.39
University of Bedfordshire		0.68	0.66	46.60	54.57
The University of Greenwich		0.68	0.55	52.44	62.29
Coventry University		0.70	0.46	50.56	73.79
University College Birmingham		0.71	0.63	45.59	57.89
Birkbeck College		0.71	0.56	46.32	66.21
University of Hertfordshire		0.73	0.32	47.07	83.94
Roehampton University		0.74	0.48	45.87	71.35
The School of Oriental & African Studies		0.74	0.56	39.55	66.21
London South Bank University		0.75	0.58	40.10	54.14
The University of West London		0.75	0.70	40.08	48.90
Kingston University		0.77	0.46	41.91	74.42
Aston University		0.78	0.63	31.79	57.89
London Metropolitan University		0.78	0.51	29.72	68.09
St George's Hospital Medical School		0.78	0.48	38.02	71.35
Queen Mary University of London		0.78	0.64	40.73	45.12
The University of Buckingham		0.79	0.23	34.30	89.55
The University of East London		0.79	0.84	30.04	28.82
Middlesex University		0.79	0.58	36.21	64.09
Brunel University London		0.80	0.60	38.27	60.48
The University of Westminster		0.80	0.61	38.20	61.65
Institute of Education		0.85	0.56	27.17	66.21
The City University		0.86	0.51	27.34	68.09